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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,083	10/03/2003	Axel Konig	4147E (CON)	3557

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ENGELHARD CORPORATION
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EXAMINER	
STRICKLAND, JONAS N	

ART UNIT	PAPER NUMBER
1754	

DATE MAILED: 03/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

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Office Action Summary	**Application No.** 10/679,083	**Applicant(s)** KONIG ET AL	
	Examiner Jonas N. Strickland	**Art Unit** 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Detailed Action is in response to the amendment filed on 12/02/2004. Claims 1-20 are currently pending. Claim 13 has been amended.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1, 2, 7, 9-14, 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Domesle (US Patent 5,157,007) in view of Kasahara et al. (US Patent 5,270,024) and Imanari et al. (US Patent 4,466,947).

Domesle teaches a method of treating exhaust gases from a diesel engine which gas has soot particles and hydrocarbons. The gas is contacted with a catalyst consisting of gamma alumina, a platinum group metal, vanadium oxide, and a zeolite having acid properties, namely, the proton form of mordenite. This zeolite meets the claimed formula were 100% of the cations M1 are hydrogen ions, M2 is aluminum, the Y to X ratio is within the claimed range (see Example 21 in Domesle at col. 4, lines 65-69 and Table 2, example 21). Moreover, the reference generally describes that the catalyst of the Domesle invention clearly combusts soot particulates of carbon (col. 4, lines 3-10), which would reduce the size or quantity of soot particles. However, Domesle does not disclose the rare earth cations.

Kasahara teaches that a zeolite such as a proton-form mordenite, ZSM-5, or ferrierite (col. 3, lines 9-25), loaded with rare-earth ions, give rise to a "weak acid site" in the zeolite, which is capable of converting hydrocarbons contained in a lean-burning internal combustion exhaust gas, into lower olefins and oxygen-containing organic compounds (col. 5, lines 9-45). Conversion of a hydrocarbon to a lower olefin constitutes the cracking of a relatively longer chain hydrocarbon into a relatively shorter chain (i.e. "lower") hydrocarbon. The zeolite may be in the absence of a platinum group metal. Kasahara teaches wherein a rare-earth ion, such as La is exchanged with a zeolite (col. 8, lines 33-36)

Imanari et al. teaches a catalyst which is applied to an exhaust gas, not only containing nitrogen oxides, but also sulfur oxides and soot. The catalyst is comprised of a zeolite and rare-earth metals (see abstract and col. 5, lines 32-49). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a zeolite exchanged with a rare-earth metal in order to treat an exhaust gas comprised of nitrogen oxides and soot.

Furthermore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Domesle based on the teachings of Kasahara to expect one of the metal cations to comprise rare earth cations, since Kasahara teaches that a zeolite such as a proton-form mordenite, ZSM-5, or ferrierite (col. 3, lines 9-25), loaded with rare- earth ions, give rise to a "weak acid site" in the zeolite, which is capable of converting hydrocarbons contained in a lean-burning internal combustion exhaust gas, into lower olefins and oxygen-containing organic compounds. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill in the art would have expected a process which treats exhaust gas using a zeolite as taught by Kasahara to be similarly useful and applicable to a process for treating exhaust gas using a zeolite as taught by Domesle.

With respect to claim 9, Kasahara teaches using Sr or Ba (col. 6, lines 64-66). With respect to claim 11, Domesle teaches vanadium and with respect to claim 12, Kasahara teaches wherein the zeolite contains Cu (col. 5, line 62 – col. 6, line 4). Kasahara teaches loading La and cerium onto the zeolite, with respect to claim 16 (col. 8, lines 33-42).

5. Claims 3-6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Domesle (US Patent 5,157,007) in view of Kasahara et al. (US Patent 5,270,024) and Imanari et al. (US Patent 4,466,947) as applied to claims 1, 2, 7, 9-14, and 16-20 above, and further in view of Tamura (US Patent 5,041,272).

The difference between the above references' teachings and the instant claims are: the claims further specify that the acidic zeolite used be a faujasite optionally dealuminized, or a dealuminized mordenite, or a pentasil having a silica-to-alumina ratio of 25-2000.

However, Tamura teaches that for removing NO_x from exhaust gases of diesel engines, it is advantageous to use a zeolite of the Y type, or faujasite type, or mordenite, or ZSM-5 (pentasil), which is in acidic form, and which has a silica/alumina ratio higher than 10 and of 40 in the case of the pentasil (col. 1, lines 35-60 and col. 2, lines 1-46 and col. 4, lines 10-11). The advantage is that NO_x can be reduced in diesel engine exhaust gas without the addition of ammonia. Note that a mordenite or faujasite of high silica/alumina ratio is taken to be suggestive of "dealuminized" mordenite or faujasite (col. 1, lines 46-50).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used Tamura's pentasil of silica/alumina ratio of 40, or dealuminized faujasite or mordenite as the zeolite in the process of the combined references as combined above, because Tamura teaches that said type of zeolite is capable of catalyzing the reduction of NO_x in diesel engine exhaust gas, without the addition of ammonia. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill in the art would have expected the process of Tamura to be similarly useful and applicable to the processes of Domesle, Imanari et al. and Kasahara, which all teach using zeolites in treating exhaust gases.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Domesle (US Patent 5,157,007) in view of Kasahara et al. (US Patent 5,270,024) and Imanari et al. (US Patent 4,466,947) as applied to claims 1, 2, 7, 9-12, 14, and 16-20 above, and further in view of Horiuchi et al. (US Patent 5,00,929).

Applicant claims with respect to claim 15, wherein sulfur dioxide is not oxidized in the exhaust gas.

The teachings of Domesle, Imanari et al. and Kasahara have been discussed with respect to claims 1, 2, 7, 9-12, 14, and 16-20. However, the limitation of claim 15 is not recited in the instant claims.

Horiuchi teaches that a catalyst comprising palladium and a zeolite is capable of burning carbonaceous fine particles contained in diesel engine exhaust without at the same time oxidizing SO_2, as long as platinum is avoided (col. 1, lines 37-46 and col. 1, line 67-col. 2, line 50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have exchanged the acidic zeolite of Domesle in view of Kasahara with palladium, because Horiuchi teaches that palladium, a species of a platinum-group metal, advantageously also does not oxidize SO_2, but does form part of a catalyst composition with a zeolite, which is capable of burning soot.

Response to Arguments

7. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonas N. Strickland whose telephone number is 571-272-1359. The examiner can normally be reached on M-TH, 7:30-5:00, off 1st Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jonas N. Strickland
March 1, 2005

STEVEN BOS
PRIMARY EXAMINER
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